

Appl. No.: 09/510,966
Amdt. dated June 25, 2004
Reply to Office Action of March 31, 2004

REMARKS

Status of the Claims

Claims 1-21 remain pending.

Rejections under 35 USC § 102

Claim 1 stands rejected under 35 USC §102(e) as being anticipated by U.S. Patent No. 6,647,058 ("Bremer"). Claim 2 stands rejected under 35 USC § 102(e) as being anticipated by U.S. Patent No. 6,069,922 ("Dyke"). Claim 3 stands rejected under 35 USC § 102(e) as being anticipated by U.S. Patent No. 6,658,010 ("Enns"). Claims 4-5, 9, 13-14 and 18 stand rejected as being anticipated by U.S. Patent No. 6,549,520 ("Gross").

"To anticipate a claim, the reference must teach every element of the claim." MPEP § 2131. Applicants traverse these rejections because the cited art fails to teach (or even suggest) every element of the claims.

For example, claim 1 as amended recites "the power spectral density of the transmitted uplink signals is proportional to the power spectral density of the transmitted downlink signals." The examiner cites Bremer at col. 5, ll. 38-51 as teaching PSD proportionality between uplink and downlink signals. The cited portion of Bremer merely describes a technique for measuring signal to noise ratio, namely, to first measure the PSD of channel noise alone, and then to measure the PSD of a noise-corrupted test signal. Bremer does not here or elsewhere teach any particular relationship between the uplink and downlink PSDs, much less a proportionality relationship. For at least this reason, applicants maintain that claim 1 is allowable over the cited art.

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Independent claim 2 recites in part:

at frequencies below a selected frequency M_{E2F} , the power spectral density of the transmitted uplink signals is proportional to the power spectral density of the transmitted downlink signals by a positive scale factor, ...

at frequencies above M_{E2F} , the power spectral density of the uplink signals are limited to one or more uplink frequency bands and the downlink signals are limited to one or more downlink frequency bands that are disjoint from the uplink frequency bands, and ... the total bandwidth of the uplink frequency bands is proportional to the total bandwidth of the downlink frequency bands by the same positive scale factor

The examiner cites Dyke at Fig. 3 and col. 7, line 29 to col. 8 line 13, as teaching these limitations. The figure shows PSDs for upstream and downstream signals. As described by the cited text, the PSDs are different in that the downstream PSD is double-lobed and concentrates information energy at low frequencies, whereas the upstream PSD is single-lobed and concentrates information energy at high frequencies. There is no teaching here or elsewhere in Dyke that the PSDs are proportional below some frequency and disjoint above the frequency as required by the claims. For at least this reason, applicants maintain that claim 2 is allowable over the cited art.

Independent claim 3 recites "when the connection is initialized, frequency bands are allocated to the uplink and downlink power signals so that the total uplink and downlink capacity is maximized over the channel for predetermined uplink and downlink average signal powers". The examiner cites Enns at col. 14, line 65 - col. 15, line 11; col. 18, lines 44-67; and col. 19, line 55 - col. 20, line 16, as teaching these limitations. In the first of the three cited portions, Enns describes the allocation of upstream channels to different subscribers. (Each upstream channel is a particular "frequency on time" slot.) In the second of the cited portions, Enns describes adjusting upstream data rates, and mentions in passing that "Preferably, the maximum transmit rate of the remote device is determined at subscription time." This statement clearly refers to the hardware limits of the remote device, not the channel capacity (which would be expected to change over time). In the last of the cited portions, Enns describes adjusting the remote device's

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transmit carrier frequency. Enns fails to provide, in the cited portions or elsewhere, any teaching of maximizing the total uplink and downlink capacity. To the contrary, Enns teaches that the upstream and downstream capacities are independently scalable (Abstract, lines 3-6), and thus not amendable to joint maximization under a predetermined power constraint. For at least these reasons, applicants maintain that claim 3 is allowable over the cited art.

Independent claim 4 recites "transmitting a downlink signal with a transmitted downlink PSD that is proportional (but substantially unequal) to the transmitted uplink PSD". Independent claim 13 recites a modem configured to perform a similar operation. The examiner cites Gross at col. 11, line 52 - col. 12, line 45 and col. 22, line 50 - col. 23, line 9, as teaching this limitation. In both cited portions, Gross teaches controlling upstream and downstream power levels. However, Gross does not here or elsewhere teach that the upstream and downstream power spectral densities are proportional. To the contrary, Gross teaches "the upstream or ATU-C modem transmits downstream to the ATU-R modem over a first set of subchannels, and the downstream or ATU-R modem transmits upstream to the ATU-C modem over a second, different, set of subchannels." Col. 5, lines 47-52. For at least this reason, applicants maintain that independent claims 4 and 13, and their dependent claims 5 and 14, are allowable over the cited art.

Independent claim 9 recites "jointly optimizing a transmitted uplink PSD and a transmitted downlink PSD to maximize a sum of uplink and downlink capacities subject to a predetermined average uplink power and a predetermined average downlink power, wherein the predetermined average uplink and downlink powers are unequal". Independent claim 18 recites a modem configured to perform a similar operation. The examiner cites Gross at col. 8, lines 5-60 as teaching this limitation. The cited portion of Gross discusses the use of varying power margins and multiple channel parameters that can be quickly changed based on signal to noise ratio measurements. Gross does not here or elsewhere provide any teaching or suggestion of jointly optimizing uplink and downlink PSDs, let alone provide any teaching of performing such a joint

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optimization subject to predetermined, unequal, uplink and downlink powers. For at least this reason, applicants maintain that independent claims 9 and 18, along with their dependent claims 10-12 and 19-21, are allowable over the cited art.

Rejections under 103

Claims 6-8, 10-12, 15-16, 17? and 18-21 stand rejected under 35 USC § 103 as being unpatentable over Gross in view of Dyke.

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). See MPEP 2143.03. Applicants traverse these rejections because the cited art fails to teach or suggest all of the claim limitations.

Independent claim 6 recites in part:

at frequencies below a selected frequency M_{EF} , the transmitted downlink PSD is proportional to the transmitted uplink PSD by a positive scale factor, [and] at frequencies above the selected frequency M_{EF} , the transmitted downlink PSD is ... disjoint from ... the transmitted uplink PSD

Independent claim 15 recites a modem having similar limitations. The examiner acknowledges that Gross fails to teach the above limitations, and cites Dyke at col. 7, line 33 - col. 8, line 12 as teaching these limitations. The cited text relates to Dyke's Fig. 3, which shows PSDs for upstream and downstream signals. As described by the cited text, the PSDs are different in that the downstream PSD is double-lobed and concentrates information energy at low frequencies, whereas the upstream PSD is single-lobed and concentrates information energy at high frequencies. There is no teaching or suggestion here or elsewhere in the cited art that the PSDs are proportional below some frequency and disjoint above the frequency as required by the claims. For at least this reason, applicants maintain that independent claims 6 and 15, along with their dependent claims 7-8 and 16-17, are allowable over the cited art.

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Claims 10-12 depend from independent claim 9, and thus incorporate the limitations of that claim. As noted previously in with respect to claim 9, Gross fails to teach or suggest jointly optimizing uplink and downlink PSDs, nor can applicants find any such teaching or suggestion in Dyke. For at least this reason, applicants maintain that dependent claims 10-12 are allowable over the cited art.

Independent claim 18 recites a modem configured to "jointly optimize a transmitted uplink PSD and a transmitted downlink PSD to maximize a sum of uplink and downlink capacities subject to a predetermined average uplink power and a predetermined average downlink power, wherein the predetermined average uplink and downlink powers are unequal". The examiner acknowledges that Gross fails to teach the above limitations, and cites Dyke at col. 7, line 33 - col. 8, line 12 as teaching these limitations. As noted previously, the cited text relates to Dyke's Fig. 3, which shows PSDs for upstream and downstream signals. As described by the cited text, the PSDs are different in that the downstream PSD is double-lobed and concentrates information energy at low frequencies, whereas the upstream PSD is single-lobed and concentrates information energy at high frequencies. There is no teaching or suggestion here or elsewhere in the cited art that the PSDs are proportional below some frequency and disjoint above the frequency as required by the claims. For at least this reason, applicants maintain that independent claim 18, along with its dependent claims 19-21, are allowable over the cited art.

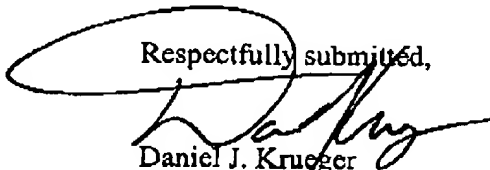
Conclusion

In the course of the foregoing discussions, applicants may have at times referred to claim limitations in shorthand fashion, or may have focused on a particular claim element. This discussion should not be interpreted to mean that the other limitations can be ignored or dismissed. The claims must be viewed as a whole, and each limitation of the claims must be considered when determining the patentability of the claims. Moreover, it should be understood that there may be other distinctions between the claims and the prior art which have yet to be raised, but which may be raised in the future.

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In view of the foregoing amendments and remarks, Applicants submit that all pending claims are now in condition for allowance, and an early notice to that effect is earnestly solicited. If any fees are inadvertently omitted or if any additional fees are required or have been overpaid, please appropriately charge or credit those fees to Conley Rose, P.C. Deposit Account Number 03-2769/1789-01910/HDJK.

Respectfully submitted,



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